

IN THE CLAIMS

1-15. (Cancelled)

16. (Currently Amended) A method for coating a surface of a substrate with a polymer solution comprising:

securing a substrate to be coated with a polymer solution in a coating chamber having a rotatable chuck, the rotatable chuck to support the substrate;

generating a carrier-solvent vapor mixture and saturating the coating chamber with the carrier-solvent vapor mixture, wherein a carrier gas is mixed with a solvent vapor to form the carrier-solvent vapor mixture;

removing excess solvent liquid that did not get transformed into the solvent vapor from the region above the substrate within the chamber to form a reduced droplet carrier-solvent vapor mixture ~~prevent the excess solvent from dropping on the~~ substrate;

injecting the reduced droplet carrier-solvent vapor mixture into the coating area region above the substrate, wherein the coating area region above the substrate is saturated with the reduced droplet carrier-solvent vapor mixture;

dispensing the polymer solution over a surface of the substrate while the coating chamber is saturated with the carrier-solvent vapor mixture; and

rotating the substrate to spread the polymer solution over the surface of the substrate; and

wherein the reduced droplet carrier-solvent mixture helps prevent excess solvent from dropping on the substrate.

17. (Currently Amended) The method of claim 16 comprising:

causing a solvent liquid level within the coating chamber to be detected, the solvent liquid being excess solvent that did not get transformed into the solvent vapor;
and
removing the excess solvent by vaporizing the excess solvent.

18. (Previously Presented) A method for coating a surface of a substrate with a polymer solution comprising:

securing a substrate to be coated with a polymer solution in a coating chamber having a rotatable chuck, the rotatable chuck to support the substrate;

generating a carrier-solvent vapor mixture and saturating the coating chamber with the carrier-solvent vapor mixture, wherein a carrier gas is mixed with a solvent vapor to form the carrier-solvent vapor mixture;

collecting the excess solvent that did not get transformed into the solvent vapor in a collector above a coating area within the coating chamber, the collector having a raised edge to prevent the excess solvent from spilling into the coating area;

removing the excess solvent through a removal line placed in communication with the collector to prevent the excess solvent from dropping on the substrate;

dispensing the polymer solution over a surface of the substrate while the coating chamber is saturated with the carrier-solvent vapor mixture; and

rotating the substrate to spread the polymer solution over the surface of the substrate.

19. (Previously Presented) The method of claim 18 wherein the collector comprises a plurality of grooves.

20. (Original) The method of claim 16 comprising:

flowing the carrier-solvent vapor mixture into a coating area using a showerhead having a plurality of openings, the showerhead being placed above the coating area within the coating chamber, wherein the carrier-solvent vapor mixture is flown into the coating area through the plurality of openings to saturate the coating area.

21. (Original) The method of claim 20, wherein the plurality of openings in the showerhead have sizes ranging from 0.010 μm to 0.085 μm .

22. (Previously Presented) A method for coating a surface of a substrate with a polymer solution comprising:

securing a substrate to be coated with a polymer solution in a coating chamber having a rotatable chuck, the rotatable chuck to support the substrate;

generating a carrier-solvent vapor mixture and saturating the coating chamber with the carrier-solvent vapor mixture, wherein a carrier gas is mixed with a solvent vapor to form the carrier-solvent vapor mixture;

collecting the excess solvent that did not get transformed into the solvent vapor in a collector above a coating area within the coating chamber, the collector having a raised edge to prevent the excess solvent from spilling into the coating area;

removing the excess solvent through a removal line placed in communication with the collector to prevent the excess solvent from dropping on the substrate;

flowing the carrier-solvent vapor mixture into the coating area using a showerhead having a plurality of openings, the showerhead being placed above the coating area within the coating chamber, wherein the carrier-solvent vapor mixture is flown into the coating area through the plurality of openings to saturate the coating area; and

dispensing the polymer solution over a surface of the substrate while the coating chamber is saturated with the carrier-solvent vapor mixture; and

rotating the substrate to spread the polymer solution over the surface of the substrate.

23. (Original) The method of claim 16, wherein generating the carrier-solvent vapor mixture includes:

introducing the solvent to be transformed into the solvent vapor into a first conduit of a vapor distributor, the vapor distributor including a solvent vapor generator to transform the solvent into the solvent vapor;

introducing the carrier gas into a second conduit of the vapor distributor;

vaporizing the solvent to create the solvent vapor;

mixing the solvent vapor with the carrier gas to create the carrier-solvent vapor mixture; and

introducing the carrier-solvent vapor mixture into the coating chamber to saturate the coating chamber.

24. (Original) The method of claim 23 further comprises coupling a solvent source and a carrier gas source to the vapor distributor.
25. (Original) The method of claim 16 further directing the excess solvent removed from the coating chamber into a container.
26. (Previously Presented) The method of claim 16 further comprises coupling a polymer solution source to the polymer dispenser extending into the coating chamber.
27. (Previously Presented) The method of claim 16, wherein removing the excess solvent that did not get transformed into the solvent vapor further comprises,
introducing the carrier gas into a solvent remover to move the excess solvent into the solvent remover; and
removing the excess solvent into a container.
28. (Original) The method of claim 16 further comprises evaporating solvent from the polymer solution dispensed on the surface of the substrate to form a polymer layer on the surface of the substrate.
29. (Original) The method of claim 28 wherein the polymer solution is a photoresist solution and the polymer layer is a photoresist film.
30. (Original) The method of claim 16 wherein generating the carrier solvent vapor mixture is done using one of an atomizer and an ultrasonic device.

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31. (Previously Presented) The method of claim 16 wherein removing the excess solvent that did not get transformed into the solvent vapor is done using one of an atomizer and an ultrasonic device.

32. (Cancelled)

33. (New) The method of claim 18, further comprising:

causing a solvent liquid level within the coating chamber to be detected, the solvent liquid being excess solvent that did not get transformed into the solvent vapor;
and
removing the excess solvent by vaporizing the excess solvent.

34. (New) The method of claim 18, wherein generating the carrier-solvent vapor mixture includes:

introducing the solvent to be transformed into the solvent vapor into a first conduit of a vapor distributor, the vapor distributor including a solvent vapor generator to transform the solvent into the solvent vapor;

introducing the carrier gas into a second conduit of the vapor distributor;
vaporizing the solvent to create the solvent vapor;

mixing the solvent vapor with the carrier gas to create the carrier-solvent vapor mixture; and

introducing the carrier-solvent vapor mixture into the coating chamber to saturate the coating chamber.

35. (New) The method of claim 34, further comprises coupling a solvent source and a carrier gas source to the vapor distributor.

36. (New) The method of claim 18, further directing the excess solvent removed from the coating chamber into a container.

37. (New) The method of claim 18, wherein removing the excess solvent that did not get transformed into the solvent vapor further comprises,

introducing the carrier gas into a solvent remover to move the excess solvent into the solvent remover; and
removing the excess solvent into a container.

38. (New) The method of claim 18, wherein generating the carrier solvent vapor mixture is done using a device selected from the group consisting of: an atomizer, an ultrasonic device, and any combination thereof.

39. (New) The method of claim 18, wherein removing the excess solvent that did not get transformed into the solvent vapor is done using a device selected from the group consisting of: an atomizer, an ultrasonic device, and any combination thereof.

40. (New) The method of claim 18, further comprises evaporating solvent from the polymer solution dispensed on the surface of the substrate to form a polymer layer on the surface of the substrate.

41. (New) The method of claim 40, wherein the polymer solution is a photoresist solution and the polymer layer is a photoresist film.
42. (New) The method of claim 40, wherein the polymer layer is selected from the group consisting of: an organic planarization film, an anti-reflection film, a siloxane spin-on-glass film, a polyimide film, a polyimide siloxane film, and any combination thereof.
43. (New) The method of claim 22, wherein the plurality of openings in the showerhead have sizes ranging from 0.010 μm to 0.085 μm .
44. (New) The method of claim 22, wherein generating the carrier-solvent vapor mixture comprises:
- introducing the solvent to be transformed into the solvent vapor into a first conduit of a vapor distributor, the vapor distributor including a solvent vapor generator to transform the solvent into the solvent vapor;
 - introducing the carrier gas into a second conduit of the vapor distributor;
 - vaporizing the solvent to create the solvent vapor;
 - mixing the solvent vapor with the carrier gas to create the carrier-solvent vapor mixture; and
 - introducing the carrier-solvent vapor mixture into the coating chamber to saturate the coating chamber.

45. (New) The method of claim 44, further comprises coupling a solvent source and a carrier gas source to the vapor distributor.
46. (New) The method of claim 22, wherein the polymer solution forms a polymer layer selected from the group consisting of: an organic planarization film, an anti-reflection film, a siloxane spin-on-glass film, a polyimide film, a polyimide siloxane film, and any combination thereof.
47. (New) The method of claim 22, wherein generating the carrier solvent vapor mixture is done using a device selected from the group consisting of: an atomizer, an ultrasonic device, and any combination thereof.
48. (New) The method of claim 16, wherein the polymer solution forms a polymer layer selected from the group consisting of: an organic planarization film, an anti-reflection film, a siloxane spin-on-glass film, a polyimide film, a polyimide siloxane film, and any combination thereof.